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THE EDUCATIONAL ADVANCEMENT OF THE PHARMACIST AND HIS RELATION TO THE PHYSICIAN AND PUBLIC.*

By Harvey W. Wiley, M.D.

I consider it a great honor to be here to-night at your invitation to give one of the addresses in the courses which have been advertised for evening lectures before this college.

I first must be allowed to say that I am more than pleased with the inspection of the laboratories of this great college of pharmacy, and to see what splendid facilities in all branches of laboratory work its students have. In this connection I desire to emphasize the fact that the old days of the ordinary druggist have passed. When I was a boy any man who had the money or credit could start a drug store and make and dispense drugs. It was not necessary that he should even get a common school education, although, of course, it was necessary to his success that he be a good business man, and that naturally would imply that he must of necessity soon acquire knowledge, and a particular knowledge of his profession. This now has been changed in practically all parts of the country. Colleges of pharmacy exist in almost every state and rigid rules and certification for the practice of pharmacy are established in all of

* Abstract of a lecture delivered by Dr. H. W. Wiley, chief of the U. S. Bureau of Chemistry, at the Philadelphia College of Pharmacy, December 17, 1908, this being the first of the series of special lectures arranged for the Food and Drug Analysis Course for 1908–1909.

our principal cities and in most of our states. It is necessary now that a man shall have a pharmaceutical education leading at least to a degree equivalent to a three years' course, and in some cases a four years' course, before he is allowed to practise.

This leads me to say that the profession of pharmacy is just as important and just as honorable as any other learned profession, and it is highly advisable, therefore, that the preliminary training looking to the practice of pharmacy be as thorough and as complete as that of any other profession. This means that the man who intends to become a pharmacist should first have the primary and secondary instruction, followed by the usual four years' college course. It is too early yet to require in all the pharmaceutical colleges that those who enter upon their studies come with a degree representing that amount of study for which the degree of A.B. is conferred in colleges of average efficiency. Yet I think I may be allowed to become prophet long enough to say that it is surely coming. Some of our great universities, notably Harvard, have introduced that rule in regard to all their professional schools. At Harvard University at the present time no one can enter a professional school to study for a degree who has not pursued a course of study entitling him to the ordinary degree of A.B. in a good college or its equivalent in study. At first when this plan was proposed it was met with the objection that the professional schools of the university would diminish in number, in fact, the first effect of the enforcement of this rule was to diminish the number of students, but this loss in numbers was only temporary and has been followed by a steady gain which has placed the professional schools of Harvard University, in so far as professions are concerned, on a higher plane than they were before the regulations regarding admission were adopted.

The profession of pharmacy entails a degree of responsibility second only to that of medicine, and perhaps equal thereto. I will not discuss here whether or not there is any virtue in drugs. We may assume for the purpose of this discussion that there is such merit. It follows then that the only good which may come from drugs must come from the fact that they possess the properties which are accredited to them. The skill of preparation, the skill of compounding and the skill of dispensing entail the responsibility of producing in the end a combination having the properties desired by the pharmacist and required by the physician for the benefit of his patient. It is, of course, often said that the time a young man

spends in going to college could better be spent in establishing himself in his profession. That argument had greater force in the earlier history of our country where the development of its resources was so rapid and the increase of its population so great. It loses its value, however, as the country is filled up and the competition for existence becomes keener. The man who succeeds to-day in any profession is he who combines, with executive ability, aptness for the profession he has chosen and skill in carrying it into effect. A general education of high grade cannot fail to endow every one who has it with an advantage over the one who has not, and this is true aside from any practical application of the branches studied to the profession which is to be followed. It would be a sad day, indeed, for the progress of medicine and pharmacy if it were argued that those engaged in these two great professions should confine their studies, preliminary and otherwise, to those branches which bear directly upon their professional activity. Instead of producing professional men with broad views and progressive ambitions, we would end by producing narrow men, bigots without ambition and without any adequate conception of the relations which their profession bears to other activities of life. In the interests of success, therefore, alone, aside from the other benefits which come from a broad and thorough training, we should insist that the preliminary training of our pharmacists should be greater and the tests for admission to the pharmaceutical colleges should be raised to a higher plane.

One great point, it seems to me, which ought to be considered is the fact that there is no enmity between the profession of pharmacy and the profession of medicine. It is true that it is difficult, if not impossible, to draw a definite cleavage line between the two professions. The pharmacist must in some cases exercise the functions of a physician, and the physician to some extent those of the pharmacist. I might say that the pharmacist is a stationary physician and the physician an ambulatory pharmacist. There should, however, be an understanding between the two professions as to how far each should encroach upon the confines of the other. It is needless to enter into an argument to show that the physician should carry a pharmaceutical armament with him, as it would be needless to say that the pharmacist should never be permitted to dispense a remedy without a physician's prescription.

Mutual benefit, however, would come to both professions if the great evil of the patent medicine habit or the drug habit could be

eradicated from this country. Above all other countries we are victims of the drug habit. Whenever anything is the matter with an American the first thing he is expected to do is to "take something." Every one of his friends will prescribe a different remedy, every remedy so prescribed being an absolute specific remedy against the ailments from which he is suffering. The newspapers abound with advertisements calling the attention of the people to symptoms of diseases which perhaps they never have, or which the imagination easily magnifies into veritable dangers. The drug stores are filled with preparations or compounds which are regarded as specifics for almost every disease of humanity. These medicines are sold in great quantities to the laity by the druggist, thus depriving the druggist himself of the legitimate reward for compounding the remedy, and the physician from his legitimate reward of recommending it to his patient. It will be better, therefore, for both professions, as well as for the public, when the days of the deceptive dope are done.

It seems to me that for the minor diseases, for which the druggist may safely prescribe, it would be sufficient for the medical fraternity in each locality to agree with the druggist in regard to remedies which should be given for simple colds and other minor diseases. The medical association of each locality could write the prescriptions for these diseases, place them with the druggist and they could be filled by the druggist upon the direct application of the layman. Thus the layman would receive a greater benefit than ever before, and be protected from fraudulent extortion, the druggist would have a larger income and the physician would not be deprived of the necessary applications to him from those who were really ill. I do not think that any pharmacist should ever be allowed to sell a medicine to be carried to a person who is too ill to apply for it himself, nor for any disease of a character which threatens permanent injury or death.

By some such method of co-operation the bonds which hold the two great professions of pharmacy and medicine together would be strengthened, the feeling of amity between the two professions increased, with corresponding benefits to the public and with certainly no financial loss either to the pharmacist or the physician. It is well to consider these points especially in relation to the future development of the profession and its establishment upon a thoroughly scientific basis.

THE DIFFERENTIATION OF THE ENZYMES IN MILK BY HYDROGEN DIOXIDE AND ITS TESTS.

By Charles H. LaWall.

In a sample of milk recently examined, which was suspected of having been preserved with hydrogen dioxide, tests were made for that substance by three different methods. Two of these methods were reversals or adaptations of the methods commonly employed for the detection of boiled or sterilized milk, or milk in which the enzymes had been destroyed by heating.

In Dupouy's method, paradiamidobenzene is used in aqueous solution, a few drops being added to 5 c.c. of the sample, after which a few drops of hydrogen dioxide solution are added. In the presence of raw milk a strong blue coloration is obtained; milk that has been heated to over 79° C. gives no coloration. Check experiments with this method showed that in the presence of varying amounts of hydrogen dioxide solution, down to 0.5 per cent. (corresponding to 15 parts in 100,000, of absolute H_2O_2), a strong blue coloration appeared as soon as the paradiamidobenzene solution was added.

In the method recently described by Wilkinson and Peters (*Chem. Abs.*, 1908, p. 3375) the test for sterilized or heated milk is carried out with benzidine (paradiaminodiphenyl) as follows: To 10 c.c. of the milk is added 2 c.c. of a 4 per cent. alcoholic solution of benzidine, then two or three drops of acetic acid are added to produce coagulation, and finally 2 c.c. of a 3 per cent. solution of hydrogen dioxide.

The test as thus applied detects raw milk by the production of a blue zone. When employed to detect hydrogen dioxide, raw milk is used and the test is applied as described, except that instead of adding the solution of hydrogen dioxide, the milk suspected of containing the hydrogen dioxide is added. It was found that with quantities varying from 3 parts absolute H_2O_2 in 1000, down to 15 parts in 100,000, the reaction was prompt and unmistakable. So far as the detection of the hydrogen dioxide was concerned, therefore, either of the methods was equally applicable and both were found to be superior to the method of adding potassium chromate and diluted sulphuric acid, which causes the development of a blue color in presence of H_2O_2.

In view of the assertion that hydrogen dioxide disappears entirely upon standing, some experiments were made with the purpose of ascertaining whether this were true. Varying amounts of solution of hydrogen dioxide were added to milk, making dilutions from 15 parts absolute H_2O_2 in 100,000 up to 3 parts in 1000. Upon allowing these to stand over night it was found that by neither of the tests could as much as 3 parts in 10,000 be detected after standing twenty-four hours, although the milk thus treated remained sweet for three or four days standing at room temperature. The most surprising results, however, were obtained when the milk in which no reaction could be obtained for H_2O_2 was tested by both methods for the presence of the enzyme.

With the Dupouy test positive results were obtained, while with the Wilkinson and Peters test negative results were shown. In the presence of 15 to 30 parts of hydrogen dioxide per 100,000, this differentiation was most marked. In the presence of larger amounts up to 3 parts in 1000, the Dupouy test applied for the enzyme was also inhibited after several days. In the presence of the larger amounts, the Wilkinson–Peters test was inhibited immediately. A tabular statement of the experiments may serve to illustrate more fully:

Strength of H_2O_2 in milk	Wilkinson-Peters' Test	Dupouy's Test
	Test for enzyme applied immediately	
15 parts to 100,000	positive	positive
30 parts to 100,000	positive	positive
15 parts to 10,000	negative	positive
	Test for enzyme applied after 24 hours	
15 parts to 100,000	negative*	positive*
30 parts to 100,000	negative*	positive*
15 parts to 10,000	negative	positive
	Test for enzyme applied after 96 hours	
15 parts to 100,000	negative*	negative*
30 parts to 100,000	negative*	negative*
15 parts to 10,000	negative	negative

* H_2O_2 no longer detectable by reversal of test.

The foregoing results indicate:

First, that hydrogen dioxide, when added in small amounts to milk, can only be detected within a few hours after such addition, and that the resulting milk remains sweet for several days at ordinary temperatures.

Second, that it inhibits or destroys the action of the enzyme reacting with the Wilkinson–Peters test much more rapidly than it affects the enzyme reacting with the Dupouy test.

Third, that eventually it destroys the action of both of these enzymes and causes the milk to react the same as boiled or sterilized milk.

Further experiments are being undertaken to ascertain the influence of other preservatives upon these enzymes.

THE ASSAY OF DRUGS.*

By C. E. Parker.

A spirit of progress, a quickened sense of responsibility is manifest among practitioners of that branch of medicine dealing with the provision of agents for the prevention, alleviation and cure of disease which we call pharmacy. The whole prestige and distinction of the pharmacist, which differentiates him from the common merchant, is contingent upon his fidelity to that obligation to use certain professed attainments for the benefit of others which is the essence of professionalism. If he for gain promotes the use of drugs regardless of the discipline of his profession and of the public welfare, he becomes a mere drug-seller. The old-time apothecary who personally conducted practically all the details from growing drugs to dispensing prescriptions could not easily forget his professional responsibility. But the commercial development of applied pharmacy has now become so complex, and drugs pass through the hands of so many people who have no personal or professional relations with the sick for whose benefit they are destined, or whose interest in pharmacy proper is subordinate to other affairs, that there is a strong tendency to divide and dissipate responsibility.

The professional status of the retail pharmacist depends upon his success in arresting and reversing this tendency. Power and authority naturally accrue to those who are efficient in the discharge of responsibility and depart from those who fail to "make good."

The pharmacy laws of our country, which have been in a large degree shaped by the influence of pharmacists, are theoretically the

* Read at the meeting of the City of Washington Branch of the American Pharmaceutical Association, December 14, 1908.

basis of a compact whereby in consideration of his professional ability and obligation to conserve the physical welfare of the public, and to enable this to be done more effectively, the pharmacist receives certain exclusive privileges. Practically the provisions of many of these laws, and the activities of boards of pharmacy operating under their authority, have been more efficient in restricting the practice of pharmacy and thereby limiting competition, than in suppressing adulteration and other practices detrimental to the public health. Sometimes a disposition has been disclosed to regard pharmacy laws as primarily for the benefit of pharmacists rather than that of the public. On the other hand the efforts of the ethical element in pharmacy have powerfully promoted the pure drug legislation of recent years, though as an expression of public sentiment it represents a loss of prestige by the boards of pharmacy. The prevalent tendency has been to withdraw from them and entrust to other officials the authority and duty of enforcing the new laws.

These laws generally provide a system of guarantees whereby the retailer can transfer to his source of supply the responsibility for drugs sold in original packages, the liability otherwise being his own, and his willingness or unwillingness to assume the responsibility for what he sells may be expected to have a corresponding effect upon his professional standing. He may reduce his liability by selling a minimum of his own preparations, thus tending to become a mere drug distributer; or he may attack the problem of supplying a creditable proportion of legal medicaments on his own responsibility. A rigid enforcement of the requirements of these laws would oblige pharmacists, by the application of Pharmacopœial and other tests, to assure themselves of the legality of many preparations for which they are necessarily responsible. Some have had no training in this branch, and for others it has had, since their college days, but an academic interest. If a demand arises the colleges will no doubt provide suitable courses in Pharmacopœial technic, following the example of the Pharmaceutical Division of the Zurich Polytechnic, Switzerland, which gives ten-day courses of instruction and laboratory practice based on the new Swiss Pharmacopœia.

The first practical application of drug assaying was probably made to afford a rational basis of valuation in the purchase of opium and cinchona for the manufacture of alkaloids. Thus when the medical profession urged the desirability of more reliable and uniform products than the existing system of supplying medicaments afforded,

the basis for a partial solution of the problem was available. Perceiving a commercial advantage in the extended application of scientific principles, manufacturing pharmacists, who had been controlling the quality of their crude drugs to some extent by assaying, began applying the principle to finished products. The success of this experiment helped to create a demand that assay methods be officially recognized by the Pharmacopœia.

The Revision Convention was very conservative in respect to this innovation, hesitating to sanction methods which, however satisfactory for the use of trained chemists, would be liable to miscarry in the hands of the average pharmacist. Restricting the choice to methods supposed to be within the capacity of the latter, a few simple assays were made official. Though scientific progress and the needs of rational medicine were recognized by the introduction into the last Pharmacopœia of a considerable number of assays, the technical limitations of pharmacists had a restraining influence in the exclusion of microscopic characteristics of drugs and the selection of assay methods. In regard to the latter the committee was instructed that assay processes should be "reasonably simple (both as to methods and apparatus required) and lead to fairly uniform results in different hands."

The methods adopted were the consummation of protracted and painstaking labors by a group of the most competent experts in the country, and, on the whole, fairly represented the existing status of this branch of chemical analysis. Some of the most important defects have since been remedied.

Though the Pharmacopœia had been recognized to some extent in legislation, its authority was chiefly moral until the passage of the National Food and Drugs Act of 1906. The probability being somewhat vague that its standards and methods would be made the basis for general legal regulation, a fairly high degree of accuracy appeared less important than it does under the altered conditions. For example, there was no requirement that the assay methods give correct or approximately correct results.

It is necessary now to ascertain how these methods, upon which an official status has been conferred, will respond to the requirements of the official chemist and prospective witness before the courts. Before the passage of the Food and Drugs Act the Association of Official Agriculture Chemists had begun a coöperative study of analytical methods for crude plant drugs under Dr. L. F. Kebler as

referee, and since the law became operative the scope of the investigations has been considerably extended. The method of procedure, which has been found quite valuable in increasing the accuracy and efficiency of other branches of chemical analysis, is to distribute suitable uniform samples of the drugs, with detailed instructions in the methods of analysis to be tried, to a number of competent volunteer analysts, who report their results, with observations and constructive criticisms on the utility of the methods. A compilation of these returns is reported to the Convention of the Association, communicated to the collaborators, and made the basis of recommendations for the adoption of official methods for the use of the Association, or provisional methods for further study.

In this manner since 1903 methods have been studied for the assaying of opium, cinchona, ipecac, nux vomica, aconite leaves and root, belladonna leaves and root, coca and colchicum corm and seed. In every case the Pharmacopœial method has been compared with one or more other methods selected from the best available, the choice being influenced by the desirability of contrasting the aliquot and total extraction methods of obtaining the active principle, and the gravimetric and volumetric methods of determination. The Pharmacopœial method for assaying opium has been adopted as official by the Association. In regard to the results obtained by the Pharmacopœial methods for other drugs, it may be said that they can scarcely be called "fairly uniform," as they sometimes scatter widely, differences amounting to 30 or 40 per cent. of the average occurring. Other branches of analysis have made a similar showing when first made the subject of coöperative study.

Though drug assaying does not involve the application of any analytical principles peculiar to itself, it is attended by some special difficulties, so that even the competent chemist who is trained in other branches of analysis does not usually succeed in this without a certain amount of experience, and the amateur surely cannot expect to get very accurate results.

The Pharmacopœial methods are formulated in simple terms, and on carrying out the manipulations it will usually be found that more or less of the details are left to the judgment of the analyst, and there is small probability that any two attempting to follow the instructions exactly will perform the assays in an absolutely identical manner. If these differences are material it will be necessary to fill in the gaps with explicit instructions.

The methods start with the assumption that the analyst has a representative sample of the powdered air-dry drug. Air-dry drugs vary among themselves, and are affected by atmospheric conditions of humidity with respect to the amount of moisture they contain. Therefore it would be better to make a separate determination of loss of moisture on drying and compute the assay to a basis of dry drug. A representative sample of a crude drug is often very difficult to obtain. If a bale is ground and the powder mixed it is easy, but to make a representative mixture of portions from different places in the package of leaves, roots, etc., requires trained judgment. There is also difficulty in obtaining proper comminution of small samples of tough and refractory drugs, as every particle must be powdered and small mills do not readily accomplish this. For example, one would not obtain a representative sample of ipecac if he rejected any of the woody fibre which the mill refuses to grind. It is important that the powder be as fine as the Pharmacopœia directs for assay purposes, as extraction may otherwise be imperfect and cause variation in results.

In extracting the drug both by the total extraction and aliquot methods, the powder is directed to be digested in a stoppered flask with a certain amount of volatile solvent to which ammonia is usually added to liberate the alkaloid. The digestion is to be accompanied with agitation, the amount of which is somewhat indefinitely stated, though in some cases the use of a mechanical agitator is alternatively directed. The direction "with frequent shaking" will be interpreted differently by different persons, and for the sake of uniformity it would be better to direct "with continuous agitation." A mechanical agitator driven by a small electric or water motor is easily arranged.

The total extraction and aliquot methods are both recognized in the Pharmacopœia, the latter usually being preferred for drugs which contain much alkaloid or are difficult to exhaust. Both have their advocates and advantages, but the coöperative work has not yet disclosed a decided superiority on the whole for either. A few modifications are desirable, such as the use of more solvent menstruum in the total extraction of certain drugs, and filtering the solution through cotton previous to, during, or after the shaking out process.

A number of alkaloids after isolation from the corresponding drugs are directed to be determined by titration. They are dissolved

in a certain volume of tenth-normal sulphuric acid which is more than that necessary to combine with and bring them into solution, the excess being then titrated back with fiftieth-normal potassium hydroxide to the neutral point as indicated by cochineal or iodeosin solution. Owing to the relatively high molecular weight of alkaloids and the small amount usually present, small differences in measuring the few cubic centimetres of tenth-normal sulphuric acid required have a relatively large effect upon the result. It seems desirable to substitute, for tenth-normal, twentieth- or fiftieth-normal acid in corresponding amount, even though it should prove necessary to hasten solution by the use of neutral alcohol. In any case a blank titration is advisable for comparison.

These volumetric solutions are standardized upon purified potassium bitartrate as a basis. The standard is somewhat unfamiliar to analysts and a comparison with the usual standards has been instituted, but no conclusion has yet been reached. Experiments on checking the purity of the bitartrate by incinerating and cautiously igniting one of two equal portions and neutralizing the resulting carbonate with the reserved bitartrate resulted in a mixture of acid reaction. This may be attributable to loss in ignition.

The principle of the standardization is faulty in adjusting the normal potassium hydroxide (from which the fiftieth-normal is prepared by dilution) from the potassium bitartrate by the use of phenolphthalein indicator, and then adjusting the normal sulphuric acid from the normal alkali with the use of methyl-orange. In the absence of carbonates the end points of phenolphthalein and methyl-orange do not differ so materially with normal as with weaker solutions. The methyl-orange, however, is used backward, so to speak, titrations with it being more commonly made to a pink than to a yellow color. The Pharmacopœia takes cognizance of the fact that in alkaloidal titrations neither of these indicators, but a third, cochineal or iodeosin, is employed, and directs a special experiment and adjustment of the solutions for use with this indicator. The intention is apparently to have the tenth-normal acid adjusted to the fiftieth-normal alkali, whereas the acid, owing to its permanence and stability, is much better suited for a secondary standard. Cochineal as an indicator seems to give satisfaction to most analysts. As with other indicators experience teaches, and a dummy in proximity aids in determining the exact end point.

Lack of time precludes any discussion of special methods such as

the assay of opium, or modifications adapted to particular drugs, such as cinchona and nux vomica. The assay methods for galenical preparations are likely to be applied by retail pharmacists more than those for crude drugs, since the employment of a standard drug does not assure a standard product. Their interest as well as that of the public is subserved by their exercising due control over such products, for which, moreover, they cannot usually transfer the responsibility. The methods are generally quite similar to those for crude drugs, but more expeditious, since the active principle is usually already in solution or readily dissolved.

Assaying the finished product does not secure a complete remedy for all the abnormalities in drugs which may be occasioned by natural variation, accidental deterioration, or the ignorance, carelessness or cupidity of those through whose hands they pass. An assay will show, for example, how much alkaloid is present in a certain preparation, provided it is the characteristic alkaloid of the drug in question. Ordinarily it will not show whether it is that particular alkaloid or a mixture of alkaloids; nor will it usually indicate whether the original drug was mixed with other drugs or inert matter, or properly cured and in a good state of preservation. The physical examination of the original crude drug is a very important factor in controlling the quality of drug products. The process of grinding destroys many of the characteristics, and it is difficult to determine the quality of finely ground drugs even with the microscope. The efficient inspection and control of crude drugs at the point of importation into the country is therefore a very valuable agency in preventing the distribution of objectionable drugs.

THE INFLUENCE OF GLYCERIN, ACETANILID AND CERTAIN OTHER AGENTS IN THE ESTIMATION OF ALCOHOL.

By L. E. Warren and H. C. Fuller,

Drug Division, Bureau of Chemistry,—Part of Report on Medicinal Plants and Drugs to the Association of Official Agricultural Chemists, 1908, by L. F. Kebler, Referee.

Some time since the question was raised whether or not the presence of glycerin, acetanilid and certain other substances in pharmaceutical preparations would interfere with the accuracy of the estimation of alcohol. It was held by some that sufficient glycerin, acetanilid, etc. (or of their decomposition products), would be carried over in the alcoholic vapors during the distillation to raise the specific gravity of the distillate appreciably, thus giving results reading below the truth for alcohol.

An examination of the literature showed that apparently no one had investigated this particular phase of the problem, though several workers have recorded their observations on the behavior of glycerin in boiling aqueous and alcoholic solutions, and others have noted that appreciable losses occur when acetanilid is dried at temperatures above 40°, or when its chloroformic solution is evaporated on the water-bath.

Couttolenc [1] states that if glycerin be heated on a water-bath to 90° C. for five hours it will lose any water that it may contain, and that then the evaporation of glycerin proceeds at the rate of about 0.00317 gramme per hour per square centimetre of surface exposed. This proportion is increased by the admixture of sand and rapidly diminished by the lowering of the temperature.

Nessler and Barth [2] have shown that by evaporating solutions of glycerin (aqueous or alcoholic) of different strengths on a water-bath, a noticeable loss occurs. They concluded that the loss of glycerin depended upon two conditions: the strength of the solution and the volume of water evaporated.

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[1] *Répert. Pharm.*, **10**, 73 (1882); Abst. *Pharm. Jour., Tr.* [3], **12**, 804 (1882).

[2] *Z. anal. Chem.*, **21**, 44 (1882), and **23**, 327, 329 (1884); Abst. *J. Chem. Soc.*, **46**, 1434 (1884).

Hehner [3] demonstrates that the conclusion of these last two observers is erroneous in that, while glycerin doubtless is volatilized somewhat at the temperature of the water-bath when in a state of high concentration, it is not appreciably volatilized in aqueous vapor during the evaporation of the water. Aqueous solutions containing less than 50 per cent. glycerin showed no loss after several hours boiling, the volume being kept up by frequent additions of water. The loss in 73.8 per cent. solution was insignificant. Hehner did not experiment with hydro-alcoholic solutions of glycerin but, since the vapor tension of alcohol is greater than that of water, it is justifiable to assume that no glycerin would escape with the alcoholic vapors.

Gantter [4] reaches the conclusion that glycerin and water mixtures do not lose glycerin on evaporation until all of the water has been evaporated. This author did not observe any loss of glycerin when an alcohol or glycerin mixture was evaporated.

Struve [5] distilled a mixture of glycerin and water of known strength and collected the distillate in fractions. He then evaporated both the residue in the distilling flask and portions of the fractional distillates. From the results of one distillation he found a loss of about 0.379 per cent. calculated as glycerin. His results are, however, questionable since he gives no intelligible data concerning the kind of flask used, or its dimensions, particularly the mean distance from surface of the boiling liquid to the delivery. It is possible that some glycerin may have been carried over mechanically and not in the state of vapor.

Yvon [6] states that acetanilid sublimes at 90° in the form of white, light crystals.

Beringer [7] has noted that acetanilid is somewhat volatile at the temperature of the water-bath.

Moerck [8] has demonstrated that dry acetanilid suffers a constant

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[3] *Analyst*, **12**, 45, 65–7 (1887); Abst. *J. Chem. Soc.*, **52**, 1143 (1887).

[4] *Z. anal. Chem.*, **34**, 423–4 (1895); Abst. *J. Chem. Soc.*, **68**, II, 537 (1895).

[5] *Z. anal. Chem.*, **39**, 95–9 (1900); Abst. *Analyst.*, **25**, 214 (1900); Abst. *J. Chem. Soc.*, **78**, II, 446 (1900).

[6] *J. pharm. chim.* [5], **15**, 20 (1887); Abst. *Pharm. Rev.*, **17**, 804 (1899).

[7] Am. J. Pharm., **69**, 150 (1897).

[8] Pa. Pharm. Assn. Proc., **21**, 111 (1898); Am. J. Pharm., **70**, 335 (1898); Abst. Am. Pharm. Assn. Proc., **47**, 751 (1899).

and increasing loss when heated above 40°, the loss being much greater at higher temperatures. For example, between 48° and 55° 0.5000 gramme heated for one hour lost 0.00066 gramme, while between 85° and 90° the loss was 0.03625 gramme.

In estimating acetanilid Puckner [9] has observed that there is no loss when a chloroform or ether solution is evaporated at room temperature and the residue evaporated over sulphuric acid. If the evaporation be made from a narrow necked flask at 50°–60° the loss is but slight, while at 95° the loss is appreciable.

In the case of the United States against Robert N. Harper,[10] the chemist for the defense, John G. Hird, testified that in making a determination of alcohol by the A.O.A.C. method with a mixture of water, alcohol, glycerin and acetanilid, he found that the distillate " was not pure and that it contained glycerin and also a small amount of acetanilid which had distilled over with the alcohol."

In order to determine to what extent (if any), glycerin, acetanilid, and some other substances influence the determination of alcohol, a number of experiments were carried out which are detailed in this paper. In these experiments all dilutions and measurements were made at 20°. This was accomplished by filling graduated flasks nearly to the mark and placing them in a water-bath kept at constant temperature. At the end of from thirty to sixty minutes the content was made up to the mark. The specific gravity determinations were made with a pycnometer at $\frac{15.6°}{15.6°}$ for alcohol and $\frac{20°}{20°}$ for glycerin. All alcoholic strengths are given in percentage by volume.

Several methods of procedure were employed. In one a known volume of diluted alcohol of known strength was diluted with a known volume of diluted glycerin, the resultant mixture assayed, and the result compared with that calculated from the dilution. In another, a given volume of diluted alcohol of known strength was distilled to the same volume, after adding about 10 per cent. of glycerin, or about 3 per cent. of acetanilid, or 1 per cent. of antipyrin, and the result compared with the duplicate to which no addition had been made. In another 300 c.c. of diluted alcohol of known strength were diluted to 500 c.c., after the addition of glycerin, acetanilid, etc. The alcohol was then determined and the result compared with

[9] *Pharm. Rev.*, 23, 302 (1905).
[10] *Oil, Paint and Drug Reporter*, 73, 10, column 4 (1908).

the calculated value. Alcohol was determined as follows: 100 c.c. of the liquid were diluted with 60 to 75 c.c. of water, about 95 c.c. distilled into the flask originally used for measuring, and the content brought to the mark. The specific gravity was determined and the alcohol value obtained from the tables.[11] About one-half of the distillations were made from a 250 c.c. distilling flask having a delivery at a mean distance of about 16 cm. from the surface of the boiling liquid. The remainder were made from a 250 c.c. flask with delivery about 10 cm. from the surface of the liquid. The results obtained from the two styles of flask were not very appreciably different, although the losses in alcohol from the calculated values were slightly greater in the flask with the longer neck.

Some diluted alcohol was prepared by mixing equal volumes of distilled water and alcohol. After standing forty-eight hours to insure maximum contraction the specific gravity was taken in triplicate. The results were 0.936304, 0.936423 and 0.936066, with a mean of 0.936264 corresponding respectively to the following percentages of alcohol: 49.028, 48.965 and 49.150; mean, 49.048. The greatest difference in specific gravity was 0.000357 corresponding at this concentration to a difference of 0.185 per cent. of alcohol. The mean value, 49.048 per cent., was assumed to be the correct one and all calculations in succeeding dilutions are based upon it.

The alcohol in the above mixture was determined twice. Sample A: specific gravity, 0.936825; alcohol, 48.756 per cent.; loss, 0.292 per cent. Sample B: specific gravity, 0.936731; alcohol, 48.82 per cent.; loss, 0.228 per cent. Mean loss, 0.26 per cent. Although great precautions were taken to prevent leakage through the joints of the apparatus there was an appreciable loss.

A sample of diluted glycerin was prepared by mixing 100 c.c. of U. S. P. glycerin with 400 c.c. of distilled water. The specific gravity of this mixture was then determined and the percentage of glycerin calculated from Nicol's tables.[12] Specific gravity, 1.05715; glycerol, 23.25 per cent. by weight.

Two samples of this diluted glycerin of 100 c.c. each were then distilled as for alcohol by the usual method and the specific gravity of the respective distillates taken at 20°. The results were 1.0000003 and 1.000113; mean 1.000056 corresponding to 0.0241 per cent.

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[11] U. S. Dept. Agr., Bur. Chem., Bull. 107, p. 203.

[12] *Pharm. Jour. Tr.* [3], 18, 302 (1887).

glycerol, an entirely negligible quantity. One-half of one of these distillates was evaporated on the water-bath to about 1 c.c. and the evaporation continued to constant weight in a desiccator over sulphuric acid. The residue weighed 0.0007 gramme, equivalent to 0.0014 gramme for the entire distillate, or 0.006 per cent. calculated as glycerin. Water was then added to the residue from the last distillation (in the distilling flask), and about 90 c.c. distilled off. After diluting to 100 c.c. the specific gravity was 1.0000096 at $\frac{20°}{20°}$; glycerin, 0.004 per cent. Fifty c.c. of this distillate gave a residue of 0.0013 gramme or 0.0026 gramme for the entire sample; equivalent to 0.0112 per cent. of glycerin.

Mixed 500 c.c of the diluted alcohol and 250 c.c. of the glycerin mixture with sufficient water to make 1000 c.c. after allowing for contraction. By calculation this mixture contains 24.524 per cent. of alcohol and about 5.9 per cent. of glycerin. The alcohol was determined in each of two 100 c.c. samples. A: specific gravity, 0.971671; alcohol, 24.33 per cent.; loss, 0.194 per cent. B: specific gravity, 0.971701; alcohol, 24.30 per cent.; loss, 0.224 per cent. Mean loss, 0.209 per cent. A mean alcoholic loss of 0.209 per cent. in this determination (in which glycerin was present), compares favorably with a mean loss of 0.26 per cent. of alcohol in the determinations in a preparation containing no glycerin. Evaporation of 50 c.c. from one of these distillates gave no weighable residue.

A mixture of alcohol and water was assayed for alcohol by the usual method, 50 c.c. being taken for the test; specific gravity, 0.96889; alcohol, 26.95 per cent. Another sample of 50 c.c. of the same mixture was taken, 10 per cent. of glycerin added, and the alcohol determined as above: specific gravity, 0.96890; alcohol, 26.937 per cent.; loss, 0.02 per cent. These apparent losses could have been due to two possible causes: (1) A portion of the glycerin may have been volatilized, thus causing an increase in the specific gravity of the distillate, or, (2) a portion of the alcohol may have escaped by leakage through the joints of the apparatus. That the first theory is untenable is seen by the fact that the alcoholic distillates gave no weighable residues on evaporation.

From the foregoing, it is reasonable to conclude that glycerin does not appreciably affect the determination of alcohol.

In mixtures of glycerin and alcohol only, both may be determined from one sample, as follows: Determine the alcohol in the usual way, make up the residue in the distilling flask to the original volume,

determine the specific gravity and compute the percentage of glycerin from the published tables.[12]

To 100 c.c. of a glycerin-alcohol-water mixture (which assayed 23.89 per cent. alcohol), 3.85 grammes of acetanilid were added, the mixture made up to 110 c.c. and the original volume (100 c.c.) distilled by the usual method. Specific gravity of distillate, 0.97212; alcohol, 23.89 per cent. It is seen that the addition of acetanilid did not influence the determination of alcohol. Fifty c.c. of the distillate, when evaporated on the water-bath to about 1 c.c. and the evaporation continued over sulphuric acid gave 0.0013 gramme residue. The residue gave the isonitril reaction, indicating the presence of acetanilid.

A mixture of alcohol and water was assayed for alcohol: specific gravity, 0.97236; alcohol, 23.65 per cent. An equal volume of the same mixture was treated in the same way after adding about 3 per cent. acetanilid: specific gravity, 0.97220; alcohol, 23.80 per cent.; gain, 0.15 per cent. One-half of this last distillate was shaken out three times with chloroform, filtered and evaporated and the residue dried over sulphuric acid: residue, 0.0053 gramme; proportion distilling over, 0.706 per cent. The residue gave the isonitril reaction and a precipitate of tribrom acetanilid with bromine water.

From the results of these experiments with acetanilid it is seen that this substance volatilizes somewhat in the vapors of boiling water (or in hydro-alcoholic vapors), but that the quantities distilling over in carrying out the determination for alcohol are not sufficient to appreciably vitiate the alcoholic values. In addition to these experiments, another series was conducted in each of which 300 c.c. of 41.509 per cent. alcohol were taken. Glycerin, acetanilid, and antipyrin were respectively added to different samples and each diluted to 500 c.c. Duplicate alcohol determinations were then made from each sample by each worker and the results compared with the calculated values. Aliquots of each distillate were evaporated and weighed. A mixture containing alcohol, water, glycerin, acetanilid, antipyrin, caffeine and the bromides of potassium and sodium was prepared and the alcohol and the solids in the distillate determined. Lastly, a similar mixture, but containing sugar in addition, was subjected to the same treatment. The results are given in the sub-

[12] Nicol, W. W. J.; *Pharm. Jour. Tr.* [3], **18**, 302 (1887).

joined table. An examination of these results shows that none of the substances added exert any marked vitiating influence in the determination of alcohol.

DETERMINATION OF ALCOHOL IN VARIOUS MIXTURES (FULLER).

Description of mixture	Alcohol			Residue from 50 c.c. distillate	Per cent. solids distilling over
	Specific gravity	Percent. found	Per cent. gain or loss		
Alcohol and water	0.97086	25.10	.....	.....	....
	0.97071	25.25	.....	.....	....
Alcohol, water and glycerin	0.97085	25.11	—0.065	.....	....
	0.97098	24.99	—0.185	.....	....
Alcohol, water and acetanilid	0.97087	25.09	—0.085	0.0163	0.109
	0.97082	25.14	—0.035	0.0287	0.191
Alcohol, water and antipyrin	0.97077	25.19	+0.015	0.0006	0.120
	0.97085	25.11	—0.065	.....	....
Alcohol, glycerin, acetanilid, antipyrin, caffeine, sodium bromide and potassium bromide.	0.97082	25.14	—0.035	0.0033	0.051
	0.97071	25.25	+0.075	0.0066	0.101
Same as above with sugar added	0.97082	25.14	—0.035	0.0197	0.1492
	0.97080	25.16	—0.015	0.0194	0.1515

DETERMINATION OF ALCOHOL IN VARIOUS MIXTURES (WARREN).

Description of mixture	Alcohol			Residue from 50 c.c. distillate	Per cent. solids distilling over
	Specific gravity	Percent. found	Per cent. gain or loss		
Alcohol and water	0.97093	25.04	.....	.....	....
	0.97102	24.95	.....	.....	....
	0.97090	25.07	.....	.....	....
Alcohol, water and glycerin	0.97121	24.77	—0.25	0.0003	0.012
	0.97123	24.89	—0.27	0.0007	0.028
Alcohol, water and acetanilid	0.97133	24.65	—0.37	0.0012	0.08
	0.97108	24.89	—0.13	0.0081	0.54
Alcohol, water and antipyrin	0.97115	24.83	—0.19	0.0011	0.11
	0.97117	24.81	—0.21	0.0012	0.12
Alcohol, glycerin, acetanilid, antipyrin, caffeine, sodium bromide and potassium bromide.	0.97117	24.81	—0.21	0.0007	0.0054
	0.97126	24.72	—0.30	0.0011	0.0084
Same as above with sugar added	0.97107	24.90	—0.12	0.0011*	0.0084

*Evaporated to dryness on steam bath.

DRUG ADULTERATION.*

By L. F. Kebler,
Chief, Division of Drugs, Bureau of Chemistry, Washington, D. C.

The subject of drug adulteration should be of the utmost interest to druggists, physicians, and consumers. No physician or patient knowingly uses a debased drug and no druggist should so far forget his responsibility to the physician, the consumer, and to the public at large as to sell such drugs. In the past, and to a certain extent at present, many conditions obtained, as will be shown this evening, which made it impossible to definitely know when a debased drug or preparation made from same was in hand. The propaganda waged during the past few years for U.S.P. and N.F. products by the pharmaceutical profession makes it eminently desirable to place in the hands of druggists, manufacturing or otherwise, uniform drugs so that by following the same formulæ different operators can produce preparations of the same physical appearance and therapeutic value from Maine to California. This will remove the greatest criticism at present extant, namely, the variation of the same remedy sold by different druggists.

Chemical standards and methods for arriving at same are recognized for many potent drugs, but often disturbing factors present themselves which render standards based upon purely chemical methods unreliable. For example, the sample of *belladonna leaves* before you consists of a mixture of *belladonna* and *phytolacca leaves*. The usual chemical analysis would not reveal the presence of the latter. The same remarks hold for this sample of *belladonna root* adulterated with *poke root*. Here is another sample consisting of a mixture of *belladonna* and *scopola leaves*. Chemical analysis might show that the per cent. of alkaloidal matter is fully up to the requirements, but if the product should be used when a belladonna preparation is called for, or vice versa, undesirable results might follow. Here I have a sample of *henbane leaves* below the standard. The leaves themselves are genuine. According to some importers this drug of proper quality is scarce and high priced and some manufacturers felt the need of some drug which could be used in fortifying the inferior leaves. The drug ultimately found which

* Read at the first meeting of the Washington Branch of the American Pharmaceutical Association, December 14, 1908.

would raise the alkaloidal content and thus apparently satisfy certain requirements was *Hyoscyamus muticus,* L. a spurious henbane. The alkaloidal content of this plant is frequently from 8 to 12 times above the maximum content of henbane leaves, but the alkaloidal material is different from that contained in henbane proper. The physiological action of the two drugs being dissimilar it is impossible to conceive how a manufacturer could expect to produce a henbane preparation which would supply the physician's need by mixing these two drugs. Chemically it would be exceedingly difficult, if not impossible, to detect such adulterations, far less in preparations made therefrom. A trained pharmacognocist, however, can easily find the fraud in the plant material by macroscopical and microscopical means. In our work both chemical and pharmacognostical methods are used. Adulterations of the above character are most pernicious. If the physician desires to make such combinations that is his privilege, but it should not be done for him surreptitiously by some ignoramus whose sole purpose is the few cents he may be able to get out of the transaction.

The higher the price of a commodity the greater is the incentive to adulterate. One of the products frequently adulterated in the past is *saffron.* When the work was begun adulterated saffron was offered for entry which was refused; then the adulterants themselves were offered which were likewise refused admission. Here are two such adulterants consisting of *calendula florets,* colored to resemble saffron. One was offered for entry under the name "*feminella,*" the other under the name "*calendula tinctura.*" The former has for years been prepared in Germany expressly for this purpose. The name "calendula tinctura" was applied by the importer to comply with the proviso of Section 7 of the Food and Drugs Act.

At the present date adulteration by complete substitution is not very common, but it is met with now and then. The sample before you is spurious *arnica flowers* with the following history: A prominent importer forwarded a sample of so-called "arnica flowers" to the Bureau of Chemistry with the information that it was imported and sold for arnica flowers. The sample was forwarded to Dr. Rusby at New York with instructions to detain all importations of this material shipped under the name arnica flowers. In due time a shipment arrived. The exact source of the product is not known excepting that it is botanically a composite. Recently a consignment of "*dog grass*" was offered for importation which was found to be

wholly spurious. The staff of the Division of Drugs was not able to identify its origin but knowing that it belonged to the grass family it was submitted to an expert of the Bureau of Plant Industry who immediately recognized the material as *Bermuda grass.* A sample of *kamala* was recently found which consists essentially of sand, colored. The latter represents a domestic transaction and is sold under the name of a prominent firm. No such product was ever encountered at the ports during the past eighteen months. Undoubtedly the firm in question did not examine the product carefully before attaching its name to the packages containing same.

A common and very old form of sophistication is the addition of inorganic matter to crude drugs. This sample of *dandelion root* contains 34 per cent. of ash which means that about 25 per cent. of inorganic material has been deliberately added. The *inorganic material* in this instance consists of small fragments about the *same color and size* as the *ground drug.* Optical inspection fails to reveal its presence, but an ash determination tells the story. A product particularly susceptible to "loading" with foreign material is *cochineal.* The form most commonly loaded, however, is the silvered variety. It is well known, however, that *black cochineal* is also occasionally weighted. The sample before you is weighted with *black sand.*

It is claimed by certain dealers that if drug products are not "stretched" there would not be enough pure material to go around. This sample of *scammony resin* contains at least 50 per cent of *rosin.* When the importer was informed of the presence of the rosin in the scammony he admitted the adulteration and stated that the practice was an old one, and he saw no reason why this consignment should not be released. Some importers are utterly indifferent to the medicinal value a drug may possess. This feature appears to be of secondary importance.

There are still a few imitation drugs on the market, for example, imitation *balsam peru,* which has been in the past largely supplied when balsam peru was ordered. This sample of *Wild Cherry Cough Drops* is also an *imitation.* The product is put up in the form of cherries and consists of a mixture of sucrose and glucose flavored with benzaldehyde and colored with cochineal. It is worthless as a medicine. There is not a trace of wild cherry present; the benzaldehyde is added to deceive the consumer.

At the Hot Springs meeting of the American Pharmaceutical

Association the Department was criticised for not having investigated certain domestic drugs. In reply to this criticism the writer stated that it was thought more expedient to direct investigations to imported products first and to deal with domestic shipments later. Investigations of the domestic samples were, however, in progress some time before the Hot Springs meeting, but at that time no information was available which could be utilized. Since then, however, a number of interesting findings have been made. Here I have three samples of *colocynth,* each representing a number of different shipments of the same manufacturer to a number of different sections of the United States. One consists *entirely* of *seeds,* another of *pulp* and *seeds,* while the third is virtually in accordance with the requirements of the Pharmacopœia. What the miller does with the colocynth pulp must be left to the future to determine. It is certain, however, that colocynth preparations made from *colocynth seeds* instead of *colocynth pulp* are worthless so far as any laxative value is concerned. To my mind this is one of the worst frauds encountered so far.

During the past few years much has been said relative to *pink root* being substituted in whole or in part by *ruellia.* There seems to be little excuse for placing an adulterated product of this character on the market. This sample, bought for *pink root,* is *ruellia.* It is claimed that ruellia is as efficient an anthelmintic as pink root, but this is an entirely different question. *Ruellia* should certainly not be sold when *pink root* is called for.

Numerous difficulties have been encountered by importers during the past few years in obtaining ipecac which contains the required 2 per cent. standard of alkaloidal material. The Pharmacopœial committee therefore reduced the standard to 1.75 per cent. The sample before you, however, contains approximately one-third of the alkaloidal material prescribed by the lowered standard. Whether or not the drug has deteriorated in value or is diluted with some agent is not known at present.

The above cases serve to illustrate how the Government is trying to protect the interests of consumers, physicians, many retail druggists and some manufacturers. Most of these parties are gratified by the results accomplished thus far. Some interests think the law is not rigidly enough enforced, others are of a contrary mind.

INAUGURAL ADDRESS AS PRESIDENT OF THE WASHINGTON BRANCH OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.*

By H. W. Wiley.

Members of the Association, Ladies and Gentlemen:

I desire first of all to thank you most cordially for the great honor you have bestowed upon me by choosing me as the first President of this new organization. I accept the honor and the office with a full sense of the fact that I as a pharmacist would be entirely unqualified for this position. Perhaps my selection may be due to the fact that I occupy somewhat of a unique position, being a Doctor of Medicine without clients and dealing in drugs without being a graduate in pharmacy. Two more contradictory positions could hardly be imagined.

In another sense, however, I am in full sympathy with the purpose of this organization. The profession of pharmacy is rapidly assuming that position among the learned and exact sciences to which it is justly entitled. The science of pharmacy, in fact, is much more an exact science than that of medicine. Its related branches of learning, namely, pharmacognosy and pharmacology, bring it into direct and immediate contact with the medical profession. In fact pharmacy and medicine may be regarded as twin sisters, united as Siamese twins, by the bonds of pharmacognosy, pharmacology, and physiology. This emphasizes the idea that physicians and pharmacists should act in harmony and sympathy and not in an antagonistic way. To a certain extent a pharmacist is also a physician, and to a certain extent the physician is also a pharmacist. Especially in districts which are thinly settled the physician becomes an ambulant pharmacist, and in more densely peopled regions the pharmacist becomes a stationary physician.

One great object which will be secured by the combined efforts of pharmacists in an organized manner will be a *rapprochement* with the great medical profession. This bringing together of the twins will, however, perhaps never result in a single being, but the *rapprochement* will be of an asymptotic character. I know that there has been at times a considerable degree of friction between

* Read Monday, Dec. 14, 1908.

the two professions of medicine and pharmacy. The physicians have complained because of the universal and very extensive dispensation of proprietary remedies by the pharmacists to the laity. On the other hand, the pharmacists have complained because of the too extensive practice of pharmacy by the physicians. These two evils complained of can perhaps never be entirely remedied, but by mutual collaboration a very great improvement may be secured.

I am sure that every member of this Association realizes the evils which come from the drug habit, and perhaps there is no country where the drug habit is so firmly established as in the United States. For instance, if you have the slightest ailment of the Schneiderian membrane every friend who calls will know of a certain and speedy remedy which can be secured at every drug store. It is remarkable how each one of these remedies is advocated by the friend as the only one which is efficacious. And so it is with every other disease. No wonder then that the pilgrimage to the patent medicine counter is so numerous and so constant. There are doubtless simple remedies which may be properly dispensed to those who have slight colds or slight diseases of other kinds, with benefit and propriety, but when the two professions come together the pharmacist will be supplied by the corresponding organization of physicians with a list of the remedies which should be permitted to be dispensed for these simple diseases; and the pharmacist, if he desires, may compound them himself. There will be, at least, no necessity of paying ten prices for a simple remedy put up under a so-called proprietary formula. Both the pharmacist and the consumer will be immensely benefited by this arrangement, and the physician will not be injured, because the ailment is of such a character that it would not in any case be carried to the notice of the physician's office. It seems to me that in the future the sale of such articles may be very properly arranged in the manner I have prescribed, with benefit to all parties.

The indiscriminate drugging of the community, at their own request, is a practice which the pharmacist should frown upon. As a rule there is very little occasion for using drugs for slight disturbances of health. If one is troubled with acidity of the stomach it may be remedied by changing the amount or character of his diet. If he has a slight cold the simple remedy which the physician recommends to the druggist will be quite sufficient without paying a fancy price for remedies offered him, many of which I doubt not

may be helpful, but many are simply remedies which the pharmacist has at his disposal and which the consumer ought to get for the proper reward to the manufacturer for supplying them. I believe, therefore, an organization of this kind, working with such an organization as the medical society of the district, may be extremely helpful and at the same time confer upon the public a much more certain and less expensive benefit. I feel quite sure there is no pharmacist here who would desire to sell at the instance of a customer suffering with a serious disease, a remedy of any kind. Such a customer should undoubtedly be referred to the physician for examination and treatment. The physicians must also do their part in this mutual benefit association and must leave to the pharmacist the furnishing of the remedies in the general way which they prescribe, although in cases of emergency or necessity, such as I have already alluded to, they would be perfectly justified in carrying their own remedies with them and dispensing them without the intermediation of the pharmacist.

Another thought which I would like to impress upon you to-night is the idea that drug laws, national, state and municipal, are not enacted for the benefit of the pharmacist directly, but that their sole purpose should be for the protection of the consumer. It is true the pharmacist will reap a great benefit from these laws—that is, the legitimate pharmacist—because their tendency in all cases is to eliminate unfair competition. I do not believe any more in absent dispensing than I do in absent medical treatment, and I do not know why a so-called drug distributer in the city of New York should supply the city of Washington with drugs. I believe in the patronage of home industries, and when I want a drug I want to get it at home. It is true there may be cases where home drugs are not of the character that the patient wants, just as occasionally he may go to some other city for some special medical treatment. These, of course, are special cases arising from special necessities. On the whole, however, I believe that the home stores should be patronized, not only for drugs, but for everything. The prosperity of the community does not depend upon one spending his money in a neighboring state. In fact there would not be a more sure way of breaking down the business of the city or village than for one having money to spend it abroad. The people would soon be in a condition in which they would have no money to spend. The law controlling the traffic in drugs is not for your benefit. You need

only to read the text of the Food and Drug Acts to understand its purpose. It is true that very often in the legislation which results in the enactment of these laws special interests receive unwarranted and reprehensible consideration. There is scarcely an act which relates to the public welfare which is not to some extent moulded by this special influence. This is true of drug as well as of food acts; acts regulating interstate commerce, rates and corporations; but such manipulation of the law is not evidently the purpose of the legislators. Judge McPherson, of the Western District of Missouri, in a recent decision under the Food and Drugs Act, emphasized this idea in a most convincing manner. He says: "This statute is to protect consumers, and not producers. It is a most beneficent and righteous statute, and within the powers of Congress to legislate concerning, and should be enforced." The sooner the manufacturer realizes this fundamental principle of this legislation the better. The main purpose of a drug law is, first, to see that the consumer gets the drug which the prescription calls for; second, that he is not subject to extortion through any secret manipulation falsely enhancing the prices at which the drug was sold; third, that the citizen be protected properly against the formation of the drug habit; and fourth, that the citizen who has already formed this unfortunate habit may be so restrained in his access to the "dope" that he may be cured of his disease.

The incidental protection to the pharmacist comes in those provisions of the act which require that he be a qualified man, that he be licensed to practise his profession, and that he be protected from unfair competition in the exercise of his profession. These features of the law, which mean to protect the pharmacist, are mere incidentals in that the real protection of the consumer may be more perfect.

In the third place I may say that the existing drug laws throughout the United States, while admirable in conception and useful in practice, still lack many features, which, if added, would greatly increase their efficiency. I have no time here, nor would it be an appropriate moment, to make a digest of the various state laws and regulations relating to traffic in drugs. I may refer for just one moment, however, to the national law as an illustration of the statement above made.

The provisions of the national laws relating to drugs are most salutary and admirable in so far as they extend, but they are not

sufficiently far reaching, and they are to some extent weakened by provisos, which, while intended to be of a proper character, are really used as vehicles of abuses. For instance, the provision of the law that drugs bearing a given name should correspond in purity and strength to the requirements of the Pharmacopœia is certainly a requirement which every honest pharmacist and every observing consumer approves, but the proviso that follows, which says that a drug may bear the same name as that in the Pharmacopœia and yet differ in strength and purity if the character of that difference be stated upon the label, is a means of confusion, and even of deception and danger. It is true that when a physician writes a prescription it is presumed to be filled by Pharmacopœial remedies, but the national law cannot go into a state and see to it that this is done. It permits a translation from one state to another of drugs bearing the name of Pharmacopœial remedies and yet differing very greatly in purity and strength therefrom. Unless the state law requires the druggist to fill his prescriptions from Pharmacopœial medicines the greatest frauds endangering life and health may be practised. What use is there, I may ask, of drugs bearing Pharmacopœial names differing from the Pharmacopœial standard? They certainly are not to be used for medicinal purposes, because a physician in prescribing a remedy, if he wants it weak in a certain ingredient would prescribe less of it. He would not prescribe a remedy bearing the same name, but differing from the standard. He would not know whether such a variable drug were present in the store. My own opinion is that the national law would be very much strengthened if drugs not of Pharmacopœial strength were entirely excluded from interstate commerce except when they be used for other purposes than medicines.

Again, the provision of the national act that certain habit-forming drugs should have their names and quantities stated upon the label is a most excellent provision in so far as warning the consumer is concerned. The consumer picking up a package of this drug and seeing that it contains a habit-forming constituent would avoid its use. On the other hand, this very element of safety to the normal consumer becomes an element of injury to the consumer who is already a victim of the habit. It guides him in selecting the very "dope" that he wishes to get.

This leads me to the fourth and last problem which I wish to present to you to-night, namely, what should be the future attitude

of this country respecting the drug habit. I believe there is no one who doubts the enormous injury which is done to the people of this country by the indiscriminate consumption of alcohol, opium, cocaine, etc. The question then arises, how is this evil to be prevented or mitigated? Just at present nearly all that is said in regard to this matter relates to one of the drugs alone, namely, alcohol, and the people of this country are rapidly adopting the conviction that prohibition is the only efficacious remedy. No one will doubt for a moment that if absolute prohibition is established the evil must disappear, but it is one thing to declare a blockade and another thing to maintain it. The laws of war provide that no nation may by simple proclamation establish a blockade. If it does not have the necessary ships to enforce the blockade it is null and void. So it is with prohibition. If a blockade is declared against alcohol in a given state or a given section of a state, it is only effective provided the police powers of the state make it effectual. The universal history, however, of prohibition so far, of the fragmental kind which has existed in this country, is that the blockade is not effective. When the saloon is abolished the "speak-easy" appears, and of the two evils the latter is regarded as the greater. If we had a world-wide prohibition in which the whole country took a part it would be different. Such an attempt is already proposed in reference to opium and an international congress is to meet in Shanghai for the purpose of having illegitimate traffic in opium universally prohibited. Already in this country under the Food and Drugs Act we have excluded smoking opium from entry and therefore from interstate commerce, but of course our laws do not exclude opium of Pharmacopœial strength. It is a fact known to you all that smoking opium is always of a lower grade. There are alkaloidal bodies and resins in opium which have a very marked effect upon the smoker, yet if the low grade opiums, that is, those containing low content of morphia, are excluded there is no reason why the high grades may not find their way into the smoking dens. They may not be so efficacious nor so desirable to the victims, but they evidently will produce something of the same effects.

Another important factor in this consideration must not be lost sight of, namely, that if we have universal, international prohibition in habit-forming drugs, we shall eliminate some of the most useful vehicles of the physician necessarily handled by the pharmacist. Hence a prohibition of a universal nature must result in the elimina-

tion of vehicles of the utmost importance to the physician and which must be handled by the pharmacist. Such international regulations, therefore, must be coupled with a means of providing for the legitimate use of these articles.

I think it will not be doubted by any that the use of a fermented or alcoholic beverage in the family, upon the family table, in domestic sociability, is not the worst feature of intemperance. The use of alcohol, opium, morphia, cocaine, etc., as official drugs should not be, and could not be, prohibited. The great question of the future therefore, it seems to me, in the elimination of these evils which now so seriously affect the human race, will be answered by a wise choice of means whereby alcoholic beverages, habit-forming drugs, and the like, may be entirely placed beyond the reach of the consuming public, except in a legitimate way, in the home consumption of beverages and the controlled use of other habit-forming drugs.

What method may prove to be most effective is of course an open question. At the present time a number of bills are pending in Congress looking to the suppression of at least a portion of the illegitimate trade in opium and a few other drugs. Doubtless many attempts will be made before the really workable and effective law comes into existence. One of the plans which promises the greatest hopes of success is that of a government monopoly. I know this is paternalism, but paternalism is a matter of politics and necessity which has come to stay. People pay to be governed and they want to be protected so their money may bring them some reward. If the principle of paternalism is wrong then all laws rest on a false basis, because every single law that I know of is a form of paternalism. When paternalism really existed in the person of the patriarch he made his own laws, and the patriarch is now the President, the King, the Emperor, working through an established constitution to establish effective methods for protecting his people. In many countries the government monopoly has already been established in tobacco and in alcohol, and there is no reason why it should not be extended to opium, to morphia, to cocaine, to caffeine, and to other habit-forming drugs. The legislation of the future, I predict, will be along these lines in so far as the drug trade is concerned. If it be urged that a government monopoly will divert legitimate trade from pharmacists, I may say that a government monopoly will render necessary the employment of an army of pharmacists. The profession will not lose, although the method of reward will be by

salary instead of by profit on the business. It seems to me the conscientious pharmacist at the present time, knowing that he is selling drugs that endanger the health and happiness of his customers, would be more than gratified to be relieved of this responsibility. I, of course, do not know how a man feels when he sells morphia to a "doper." I should have to do it a great many times before I could go to sleep without thinking about it, and I would welcome that change in business which would place this responsibility upon the government itself.

In the working out of these problems generally this Association, daughter of a vigorous parent, will do much. You live here in the Capital where national laws are made. You, more than other pharmacists, come in direct contact with the members of the Legislature. You, more than other pharmacists, will exert a controlling influence over such legislation. Therefore, in the interests of the profession and in the interests of humanity, let us study well these great problems which are now before us and choose wisely in our work for the future.

THE PHYSIOLOGICAL ACTION OF FLUIDGLYCERATES OF DIGITALIS AND ERGOT.

By John R. Rippetoe.

In the paper entitled "Fluidglycerates" presented by Mr. Geo. M. Beringer at the 1908 meeting of the American Pharmaceutical Association and published in the November issue of the American Journal of Pharmacy, formulas are given for fluidglycerates of digitalis and ergot. Mr. Beringer, in presenting formulas for these two drugs, admits that the finished preparations should be tested physiologically to determine their value.

Having an occasion recently to test samples of digitalis and ergot physiologically, advantage was taken of the opportunity to compare the action of liquid preparations of these drugs made by using glycerin and water as menstruum, with that of preparations made by using alcohol and water as menstruum.

The preparations for the tests were made as follows:

Digitalis, alcoholic.

Digitalis	10 Gm.
Alcohol, dilute, sufficient to make	100 c.c.

Digitalis, fluidglycerate.

Digitalis	10 Gm.
Glycerin and water, equal amounts, sufficient to make	100 c.c.

The drug was moistened with the menstruum, packed in a small percolator, macerated forty-eight hours, and then 100 c.c. of percolate collected.

Ergot, alcoholic.

Ergot	20 Gm.
Acetic acid	0.4 c.c.
Alcohol, dilute, sufficient to make	40 c.c.

Ergot, fluidglycerate.

Ergot	20 Gm.
Acetic acid	0.4 c.c.
Glycerin and water, equal amounts, sufficient to make	40 c.c.

Sufficient menstruum, containing the acetic acid, was used to moisten the drug, which was packed in a small percolator, macerated forty-eight hours, and then 40 c.c. of percolate collected, the percolation being allowed to proceed very slowly.

The digitalis preparations were tested on frogs. The alcoholic preparation required 0.005 c.c. per gramme-weight of frog as the minimum lethal dose, while the glycerate required 0.025 c.c. per gramme-weight to produce the same results. The alcoholic preparation was administered in the presence of the alcohol.

In testing the action of the ergot equal amounts of the two prepared liquids were administered to roosters by injecting them into the thigh muscle. Although the sample was apparently of rather poor quality a typical darkening of the comb was produced by the hydro-alcoholic extract, while the hydroglycerin extract produced only a slight paling of the comb and wattles, which soon passed off. This test was carried out in duplicate, four roosters being used for this purpose.

The physiological testing of digitalis on frogs affords results that are approximately quantitative, hence the results obtained would indicate that the hydro-alcoholic preparation is five times more potent than hydroglycerin preparation.

The testing of ergot on roosters does not afford quantitative results, and sometimes the results are not very satisfactory considered qualitatively. But, having made duplicate physiological tests of each preparation, the writer feels convinced that the hydro-alcoholic

menstruum is superior to the hydroglycerin menstruum for making liquid preparations of ergot.

It is very readily seen that the preparations made with glycerin and water as menstruum do not produce the marked physiological actions that are produced by similar preparations using alcohol and water as menstruum, hence the fluidglycerates of these two drugs could hardly be considered as taking the place of their fluidextracts. Nevertheless their fluidglycerates may possess a therapeutic value which can be better proven by clinical tests.

570 East 133d St., New York City.

BOOK REVIEWS.

HANDBUCH DER PHARMAKOGNOSIE von A. Tschirch. Mit meheren hundert Abbildungen im Text und auf Tafeln sowie verschiedenen Karten. In circa 30 Lieferungen à Mark 2.—oder in 4 Abteilungen zum Preise von je ca., Mark 15. Leipzig: Chr. Herm. Tauchnitz, 1908.

To those of us who have been using for years Flückiger's Pharmakognosie des Pflanzenreiches and regarding it as a *vade mecum* and work of reference that we could not be without, this work of Tschirch's seems like the realization of a dream. Tschirch has for years been laying the foundation for not only the execution of this work but for its reception by the pharmaceutical and medical professions. Pharmacognosy is a distinct branch of science. While the methods used in this science are similar to those employed in pure botany and chemistry, the point of view is different. Not only are the latest results in the development of botanical science and certain divisions of chemical science necessary to the pharmacognocist, but he must also consider the geographical distribution of plants and their history as well as the latest development in their cultivation, and finally follow the drugs derived from them after they are collected, cured, sorted, stored, and enter commerce, and study their constituents, structure, and other characters. In short the problem is to know drugs and to develop the most intimate knowledge concerning them so that they and their preparations may be used by the pharmacologist and physician with perfect confidence and assurance as to their identity and therapeutic quality.

Pharmacognosy has developed until eleven subdepartments are to be recognized, viz.:

1. *Pharmakoörgasie,* or the cultivation, collection and harvesting of drugs.
2. *Pharmakoëmporia,* or the commerce, exportation and importation of drugs and handling them in warehouses.
3. *Pharmakodiakosmie,* the sorting, garbling and packing of drugs.
4. *Pharmakobotanik,* or the study from the view-point of systematic, morphological, anatomical, physiological and pathological botany.
5. *Pharmakozoology,* or study of animal drugs.
6. *Pharmakochemie,* or plant chemistry.
7. *Pharmakophysik.*
8. *Pharmakogeographie.*
9. *Pharmakohistoria.*
10. *Pharmakoëthnologie.*
11. *Pharmakoetymologie.*

The book is profusely illustrated with half-tones and line drawings and under each drug is given all of the information which is available, and in accordance with this broad consideration of the subdivisions of pharmacognosy.

The conception and execution of this work are those of a master, and it will always stand as a masterpiece in its line and a monument to the genius and attainments of Professor Tschirch. It may probably be looked upon from the point of view of humanity as one of the most important books ever written, as it is likely that not only will pharmacologists but pharmacists come to recognize that pharmacognosy is fundamentally of equal importance with the other divisions of pharmaceutical science, and as Schleiden has well said, "die mutter aller naturwissenschaftlichen Disziplinen."

THE NEWER REMEDIES, including their Synonyms, Sources, Tests, Solubilities, Incompatibilities, Medicinal Properties and Doses as far as known, together with such Proprietaries as have Similar Titles. By Virgil Coblentz. Fourth Edition, revised and enlarged. Boston: The Apothecary Publishing Co., 145 High St., 1908.

This work has become an indispensable reference manual for physicians, pharmacists and students. Nearly ten years have elapsed since the publication of the last edition of the book, and in that time changes and additions have rendered the old text practically

useless and obsolete. Every pharmacist and physician needs this new text for information about the synonyms, sources, tests, solubilities, incompatibilities, medicinal properties, and doses of all the new remedies. Great pains have been made to cover the entire field of this class of preparations including proprietaries of similar sounding titles. The number of new remedies appearing in the world's markets is increasing with amazing rapidity, which, with the influx of foreign emigration and the growing commercial intercourse with other nationalities, compels the modern apothecary to be very alert as to the developments along this line. Probably no one by training, education, and practical experience is capable of writing so authoritative a work on the newer remedies as Professor Coblentz, and this book will be highly appreciated by the professions interested as well as by analysts.

PHARMACOLOGY. The Action and Uses of Drugs. By Maurice V. Tyrode. Philadelphia: P. Blakiston's Son & Co., 1012 Walnut St., 1908. Pages 255. Price, $1.50.

The medical student needs as good training in pharmacology or pharmacodynamics as in the study of the therapeutical action of drugs. This book was prepared, as stated by the author, in order to furnish the students in the Medical School of Harvard University with "a small and concise text-book which would give the facts essential to an ordinary medical student without profound scientific discussions of opposite opinions."

The author has prepared a very creditable book, based, it is true, largely on the results of the leaders in pharmacology like Schmiedeberg, Cushny, Sollman and others. The treatment is in a scientific manner and this must be helpful to the medical student as well as practitioner.

In this work the drugs are brought into groups, in connection with which is given a brief summary of the general action, following the latter is a short statement concerning the uses and applications, and lastly there is a concise description of the different preparations used in medicine, including the doses of each.

THE ART OF DISPENSING. Eighth Edition. By Peter MacEwan, F.C.S., Pharmaceutical Chemist, Editor of *The Chemist and Druggist,* London, England. 542 pages. Price $2.00. From McKesson & Robbins, New York City.

This volume, as the title implies, is a treatise upon the compounding of medical prescriptions and includes a list of the more commonly used synthetic remedies, together with a chapter on foreign prescriptions. A general treatment of methods and manipulation at the prescription counter, together with the use of various apparatus, is followed by chapters on the different forms of medication, as pills, solutions, ointments, suppositories, emulsions, etc. Incompatibilities are then discussed and numerous examples given, illustrating different types. The chapter on foreign prescriptions will be of especial value to English and Continental pharmacists and a rather uncommon addition to a treatise on dispensing is the chapter on homœopathic prescriptions. This volume would be a valuable addition to the prescription department of any pharmacy, although it has been written to fill the needs, especially, of English pharmacists. E. F. C.

PHARMACEUTICAL FORMULAS. The Chemists' and Druggists' Book of Useful Recipes for the Drug Trade. Collated chiefly from *The Chemist and Druggist* and the *Chemists' and Druggists' Diaries.* By Peter MacEwan, Phar. Chem., F.C.S. Seventh Edition. Published by *The Chemist and Druggist,* London. Price $3.50. New York, McKesson and Robbins.

The seventh edition of this compilation of recipes is a volume of 1043 pages, closely printed and by the use of small but clear type, in double columns on many pages and many abbreviations, many thousand formulas, representing most that is both good and bad in the drug trade, are introduced. The intent of the author is to preserve in this work many of the recipes that have been omitted from the more recent pharmaceutical books as obsolete, and at the same time maintain the primary purpose of presenting an up-to-date formulary. His editorial experience has been a valuable aid in selecting those formulas that have been requested or commended by correspondents. The wide range of subjects covered indicates the miscellaneous commodities that druggists are called upon to supply as well as the numerous topics on which the public look to us for information.

The Formulary is arranged into sixteen chapters and under appropriate headings the formulas are classified and grouped, but as might be expected the classifications, in some instances, are not rigidly adhered to. Each chapter and classification is usually pre-

ceded by a short, pithy preface full of historical data and advice as to manipulations and suggestions as to packages. Numerous types of labels, as to wording, are offered as suggesting to apothecaries how to practically apply and profit by the formulas and this is a valuable and commendable feature of the book.

Chapter I is devoted to toilet preparations and specialties, which the author states, afford the retailer splendid opportunity for exhibition of skill in compounding and taste in packing. Every dealer in this class of preparations should carefully peruse the editorial notes and comments in this chapter, as they lay down certain important rules for the use of such preparations as well as their proper compounding. The following simple rule regarding the use of glycerin and of fats in skin lotions is too often neglected by the heedless as well as the ignorant: "Glycerin well diluted prevents the skin drying to the peeling off point. Fatty matters should not be used as a preventive, for even in a thin layer on the skin they provoke blistering under a hot sun. The rule should be *glycerin before exposure, fats, after exposure.*"

Some of the numerous subjects treated in this chapter are, skin creams and lotions, cucumber and glycerin jellies, lip salve, camphor ice, freckle and tan washes, face powders, manicure preparations, wart, corn and chilblain cures, foot powders, face paints, cold cream, shaving cream, aromatic vinegar, smelling salts, bath powders and tablets, treatment of black eyes and of blackheads, bosom developers, etc., etc.

The spicy comments are always interesting and contain much of historical and educational value. An American chemist is quoted as an authority on face powders and as declaring "that face powders have a legitimate use in the toilet of every woman, and a use which, carefully made, need not, any more than the judicious use of a perfume, displease anyone." The author states and we hope that it is not sarcasm: "'Manicure' we owe to Americans, the most cultured of whom devote a large share of their toilet to trimming the nails, polishing them, removing skin callosities, and otherwise endeavoring to give the hands a refined appearance." On page 44 the history of "cold cream" is traced back to the "Ceratum Galeni" of the second century of the Christian era, when the originator, Claudius Galenus Pergamenus Galenos, was an imperial physician at Rome.

A formula for "Buttermilk Lotion" contains lactic acid in place

of the milk and the accompanying comment is, "Our grandmothers had great faith in buttermilk or sour milk, and some of the fine complexions of days gone by have been attributed to its liberal use as a wash. They seem to have been right, for in these more exact and refined days it has been ascertained that dilute lactic acid has the same effect; *ergo* the lactic acid in the buttermilk was the thing that made the fine complexions." These are examples of the comments throughout the volume and they add much to its readability.

Chapter II treats of preparations for the hair, and the subject is introduced with an excellent terse description of the structure of the hair and the common diseases of the scalp and beard. The chapter is replete with formulas for all sorts of hair dressings, restoratives, dyes, depilatories, applications for diseases and parasitic troubles. Some of these are published as examples of bad formulas worthy of burial and the following is the comment to two such: "We print both formulas as a warning. They are chestnuts which have travelled the rounds of the press in all parts of the world, but since it was suggested here that they deserved decent burial, they have disappeared from periodicals."

Chapter III is devoted to dental preparations and has an introductory on the teeth. The numerous recipes for powder and liquid dentifrices, tooth pastes, tooth soaps and tablets, mouth washes, dental plasters, waxes, amalgams and fillings, local anæsthetics, toothache remedies, etc., should meet all the requirements for formulas in this part of the druggist's field of work.

Chapter IV considers perfumes and the introduction is a concise outline of the preliminary processes of preparation of the odorous products and the methods and apparatus adopted to the manufacture of perfumes. The dissertation on synthetic perfumes gives in a condensed form most that is essential for the druggist-perfumer to know regarding the composition, characteristic properties and uses of these adjuncts to modern perfumery. The numerous formulas for essences, handkerchief extracts, toilet waters, colognes, sachets and solid perfumes, and fumigating perfumes of all kinds may confuse the novice, but to the more experienced they will serve as valuable aids and suggestions for either old or new combinations and the connoisseur may select from the several recipes given the "original" Farina cologne, that in his critical judgment is worthy the name.

Chapter V takes up beverages and numerous recipes are given

for homemade ales, beers and pops as well as for aërated waters, effervescent salines, syrups, etc. The author doffs his hat to the superiority of American soda water syrups and admits that "American drinks are as far ahead of English as a glass of a good vintage of champagne is above a glass of the gooseberry article, and it might be profitable to take a lesson or two from transatlantic experience." This judgment is fully explained and confirmed by the unsatisfactory formulas for fruit syrups that follow. Many of these are composed of artificial essences, artificial colorings, and artificial acids instead of the American standards for pure fruit juices and pure fruit syrups.

Chapter VI is entitled "Culinary and Household Requisites," and the variety of formulas classified under this heading is surprising. It includes such subjects as "ketchups," sausage colorings and flavorings, baking powders, artificial fruit essences, potted meats, sauces, pickles, furniture, stove and metal polishes, pest exterminators, etc. That these are offered as "pharmaceutical" would indicate that British pharmacists in the rural districts are probably quite as much general storekeepers as are the country druggists in America. Among food preservatives, benzoic acid and sodium benzoate are not mentioned, although their use for this purpose, at least in America, has been very extensive.

Horticultural and agricultural preparations are covered in a chapter. Fungoid diseases of fruits and crops and insect enemies are liberally dealt with in the formulas. Likewise grafting waxes, weed killers, cattle powders, sheep dips, veterinary remedies, poultry and bird foods and medicines are some of the topics considered.

Chapter VIII treats in an interesting way of the history of writing materials with numerous recipes for all kinds of inks. The next chapter is given to varnishes, polishes and stains and should be of special value to dealers in such products and also to wood and metal workers. It is noticeable that all the formulas for lacquers are for shellac combinations and that the pyroxylin lacquer now extensively used by metal-ware manufacturers is not mentioned.

Photographic chemicals and materials are treated in a separate chapter and the various methods for preparing gelatin plates are outlined and numerous formulas for developing, fixing, mounting, etc., are given.

Products that from their character and use are not readily classified are grouped in a "miscellaneous" chapter and here we find

formulas for such preparations as anti-incrustating boiler fluids, taxidermists' soap, cements, mucilages, freezing mixtures, matches, etc.

Bacteriological and microscopic materials are considered in a short chapter, which brings together in a convenient way a number of formulas from scattered sources that the druggist is frequently called upon to prepare.

To the pharmacist, of course, the most interesting portion of the book is the part devoted to galenical and medicinal preparations. In this chapter the formulas are arranged in the alphabetical sequence of pharmaceutical classes. Formulas from national pharmacopœias, British Pharmaceutical Codex, or any of the recognized formularies, like the N. F., may thus appear along with others that are quite ancient. The formulas proposed as substitutes for such proprietaries as chlorodyne and bromidia when thus placed alongside of each other, show very wide and unexplained variation. This assembling of formulas is very helpful to the busy pharmacist who frequently has to spend valuable time in hunting up unofficial preparations that are rarely prescribed. The editor appears at his best in the comments which bring out the history of such formulas as Haarlem Oil, Theriaca Edinensis or the ancient confections and even the quotation from the "Carols of Cockayne" serve the purpose of illustrating the evolution of the modern emulsions of cod-liver oil in place of the older nauseating method of administration.

"In the course of my lifetime I've swallowed enough
To have floated a ship of the line,
And it's purely the fault of the horrible stuff
That I've ceased to enjoy ginger-wine.
For how can you wonder to see me recoil
From a liquor I mixed with my cod-liver oil."

A valuable portion of the book is the "Synoptical Reference List" to the British Pharmaceutical Codex and another commendable feature appears in this supplementary chapter, namely, the introduction of the formulas of the second edition of the "Canadian Formulary" recently issued.

An abstract of the laws of Great Britain relating to the stamp duty on proprietary medicines and the use of methylated spirit appears in the appendix and here also are given abstracts of the Food and Drug Laws of Australia and of the United States.

The volume is an excellent compilation that should be a companion to the busy pharmacist and frequently consulted. G. M. B.

THE DESIGN AND EQUIPMENT OF SMALL CHEMICAL LABORATORIES. By Richard K. Meade, B.S., Editor of the *Chemical Engineer,* etc. The Chemical Engineering Publishing Co., Chicago, 1908.

During 1905, a series of articles upon this subject appeared in the *Chemical Engineer* and were widely read. This matter with much additional has now been gathered and appears in book form. It is a book which is certain to be welcome, because it will be helpful to a great many chemists who have to equip or rearrange laboratories, and will be glad to benefit by the experience of one who has had the same problems to face and has found solutions for them. Until a chemist has worked for several years as a practical analyst with the constant demand for rapid as well as accurate work he cannot appreciate what it is to have a properly arranged laboratory with all the conveniences possible. Mr. Meade has had the opportunity of organizing several laboratories for special lines of work in the course of his career and, therefore, is well qualified to take up his subject with personal knowledge and experience. The book takes up the general features that must be considered in every case, such as ventilation and heating, finish of walls and ceilings, and general arrangement of the interior space, and gives many excellent suggestions fitting varied locations according as the laboratory is to be a separate building or is to occupy space in a factory or office building. The construction of hoods, sinks, tables for filtration, volumetric work, distillation and ignition, the placing of the analytical balance and proper supports for the same are all covered with much valuable suggestion based upon experience.

One chapter deals with apparatus for electrochemical analysis and another with assay furnaces and accessories so that the book is of value for a wide range of readers. The book is quite fully illustrated and the author gives the sources of supply where special forms of apparatus can be purchased, believing that this will make the book more helpful to the beginner who is starting out to supply himself with an outfit. We can commend the book as quite up-to-date and thoroughly helpful to a chemist who has before him the problem of arranging and equipping a laboratory.

S. P. SADTLER.

PHILADELPHIA COLLEGE OF PHARMACY.

The quarterly meeting of the members of the college was held December 28, 1908, at 4 P.M., in the library. President French presided. Fourteen members were present. The minutes of the semi-annual meeting held September 28, were read and approved. The minutes of the Board of Trustees for September, October, and November were read by the Registrar, and approved.

The President reappointed the Committee on Legislation, adding one to the number, viz.: M. N. Kline, Chairman, Joseph P. Remington, M. I. Wilbert, William McIntyre, Warren H. Poley, Theodore Campbell.

Professor C. H. LaWall presented the following preamble and resolution, which was, on motion, adopted: "WHEREAS, the Surgeon-General of the Public Health and Marine Hospital Service has agreed to comply with the request of the Board of Trustees of the United States Pharmacopœial Convention to have compiled and published a digest of the comments on the United States Pharmacopœia, 8th Revision, and

"WHEREAS, The American Pharmaceutical Association has requested that comments on the National Formulary be included, and that the Surgeon-General of the P. H. and M. H. Service endeavor to make provision for laboratory work in connection with the U. S. P. and N. F. Revision, now, therefore, be it

"*Resolved,* That we, as members of the Philadelphia College of Pharmacy extend to the Surgeon-General of the P. H. and M. H. Service our thanks for the work he has undertaken and express the hope that he will endeavor to comply with the request of the A. Ph. A."

[The action of the college was forwarded to Washington and a reply has been received from the Acting Surgeon-General of the P. H. and M. H. Service expressing appreciation for the sentiments embodied in the resolution and stating that the question of compiling digests of comments on the National Formulary was receiving careful consideration.]

Professor Lowe offered an amendment to the by-laws proposing an abolishment of the cost for certificate of membership. A long discussion ensued, participated in by many of the members, some of whom favored abolishing also the initiation fee, while others favored retention of both fees. A motion prevailed to refer the

subject to the Committee on By-laws to report at the meeting in June, 1909.

ABSTRACT FROM THE MINUTES OF THE BOARD OF TRUSTEES.

October 2: The Committee on Property reported on the subject of placing a sign at entrance to main building. They also reported that efforts were being made to get along without further increasing the cost of lighting.

The Committee on Announcement made a report, stating that several lecturers had been secured for special lectures, the subjects to be announced in the next Bulletin.

The Committee on Scholarships reported the names of eight students to whom the various scholarships should be awarded.

November 4: Committee on Property stated that at the suggestion of a member of the Board a large portion of an unexpended balance of the Entertainment Fund of the National Association of Wholesale Druggists had been contributed to the college to be used in building a hot-house on the roof of the new laboratory.

The Committee on Instruction reported that the Committee on Special Lectures had prepared an announcement covering a course of special lectures.

The Committee on Scholarships reported that a competitive examination would be held for the award of the E. T. Dobbins scholarship.

The Committee on Examinations reported the names of Louis W. Walz and Martin Luther Hartwig as entitled to the Certificate of Proficiency in Chemistry, and the name of Maxwell Montifiore Becker as entitled to the Certificate of Proficiency in the Food and Drug Course. A ballot was had and they were duly elected to receive the certificates.

Joseph Jacobs, of Atlanta, Georgia, was elected to active membership.

Mr. French asked for some action of the Board regarding the proposed new hot-house. On motion, the matter was referred to the Committee on Property, with power to act.

December 1: The Committee on Property submitted a design, and price, for a bronze sign on the front of the college building. The committee was authorized to have a hot-house built. Mr. French called attention to the invitations for commencement issued by the students in recent years, and suggested a uniform one, the plate to

be gotten up by and be the property of the college. After explanation by the Dean the matter was referred to a committee, consisting of the President and the Dean, with power to act.

A letter was read from Messrs. Lange & Co., Tokio, Japan, expressing appreciation of the honor conferred upon one of their countrymen, Professor Nagai, in electing him to honorary membership.

William L. Swartz was elected to active membership and Felecio Paterno to associate membership.

C. A. WEIDEMANN, M.D.,
Recording Secretary.

PHARMACEUTICAL MEETING.

DECEMBER.

The third of the series of Pharmaceutical meetings of the Philadelphia College of Pharmacy was held on Tuesday afternoon, December 15, at three o'clock, with William L. Cliffe, a member of the Board of Trustees, in the chair.

Communications were read by the Secretary from John C. Wallace, Chairman of the Legislative Committee of the Pennsylvania Pharmaceutical Association; State Senator Ernest L. Tustin; Mahlon N. Kline, Chairman of the Committee on Legislation of the National Wholesale Druggists' Association; Louis Emanuel, President of the Pennsylvania Board of Pharmacy; B. E. Pritchard, of the Western Pennsylvania Retail Druggists' Association, Inc.

The first paper on the program was on "The Proposed New Medicine Bill for Pennsylvania" by Dr. Henry W. Cattell, who first spoke of the desirability of active co-operation between the medical and the pharmaceutical professions in the way of mutual support for their proposed bills at the coming session of the Legislature. Attention was called to the fact that under Frederick II, in 1241, there existed in the Two Sicilies a medical and pharmacy Act which was framed on such broad lines that it might serve as a model for even the present time. For the medical profession a preliminary education of three years in logic, or what would now correspond to a collegiate course, five years in the actual study of medicine and surgery, and one full year devoted to medical practice with advice

and under the direction of an experienced physician, was what was demanded of the one desiring to practise medicine in Italy and Sicily in the thirteenth century. If it came to the knowledge of a physician that any apothecary had for sale drugs of less than normal strength, he was bound under oath to report such a one to the court. The relations of the two professions to each other were clearly defined. The physician must not enter into any business relations with the apothecary nor must he take any of them under his protection nor incur any money obligation on their regard. Nor must any licensed physician keep an apothecary's shop himself. Pharmacists were not permitted to sell their products without having taken an oath that all their drugs have been prepared in the prescribed form, without any fraud. Then there was also a special section of the law which decreed that the growers of plants meant for medicinal purposes should be bound by a solemn oath to prepare their medicines conscientiously according to the rules of their art, and so far as it is humanly possible to prepare them in the presence of the inspectors. Violations of this law were punished by the confiscation of their movable goods. If the inspectors, however, to whose fidelity to duty the keeping of the regulations was committed, should allow any fraud in the matters that were entrusted to them, they were to be condemned to punishment by death.

Dr. Cattell then described the proposed one board medical bill for Pennsylvania in which the definition of medicine is as follows: "The practice of medicine within the meaning of this Act is the exercise or performance of an act, by or through the use of any thing or matter, or by things done, given or applied, whether with or without the use of drugs or medicine, and whether with or without fee therefor, by a person holding himself or herself out as able to treat disease, with a view to relieve, heal or cure, and having for its object the prevention, healing, remedying, cure, or alleviation of disease." Such a one board bill is now in force in all but nine of the states and territories composing the United States and it is important for the sake of uniformity and for the protection of the public at large that the class legislation of the three board bill be done away with. In this bill the greatest stress is laid upon the moral character, a good general education, and proper training in the fundamentals of medicine, it being recognized that, as the treatment of disease is dependent upon its diagnosis, special attention must be paid to anatomy, physiology, pathology, and kindred sub-

jects. As such divergence exists in therapeutics, practically none of the examination to determine the fitness of the candidate should be taken up with this subject; and the mode of getting a patient well should be left to the individual ability of each physician. Then there is a special section which calls for the refusing, revoking, or suspending a license. One of the reasons for revoking a license is the presentation to the medical council of a court record showing the conviction in due course of law of said person for procuring or aiding or abetting in producing a criminal abortion or miscarriage by any means whatsoever.

Dr. Clayton M. Thrush read a paper entitled "What Percentage of Pharmaceutical Graduates Should Fail before our Pharmaceutical Examining Boards?" in which he pointed out that a larger proportion of the applicants for registration failed since the adoption of the prerequisite law than formerly, and inclined to the view that the examinations of the State Board were not a fair test of the applicant's knowledge or ability. In order to correct this condition he suggested that the time for holding the examinations be extended so as to cover four or five days.

The chairman then called attention to the proposed Pharmacy Act for Pennsylvania which was to be presented at the meeting of the Legislature next spring and which represented the concerted action of various pharmaceutical and medical bodies which were delegated to outline such an Act (see AMERICAN JOURNAL OF PHARMACY, February, 1907, p. 96).

The draft of the Act was read by the Secretary (AMERICAN JOURNAL OF PHARMACY, January, 1909, p. 36), after which it was discussed by various members present: Representative Theodore Campbell, Charles Rehfuss, Prof. Charles H. LaWall, C. P. Gabell, Dr. Clement B. Lowe, Ambrose Hunsberger, Edwin M. Boring, and the Secretary.

A resolution was passed endorsing the proposed Act in the form in which it was read. A motion was also passed recommending that if practicable a statement should be added to Section 3, requiring, that in case any drug or preparation varies from the Pharmacopœial or other standards, the degree of variation from the standard be given on the label.

The following papers were also read: "The Canadian National Formulary," by Prof. Charles H. LaWall (see the January issue of this JOURNAL, p. 11), and on "Liquor Sodii Phosphatis Composi-

tus," by John K. Thum (see the January number of this JOURNAL, p. 10).

In regard to sodium phosphate solution, Prof. I. V. Stanley Stanislaus said, that the United States Pharmacopœia directs in the compound solution of sodium phosphate the employment of *uneffloresced crystals* of the salt. The manufacturers supply the salt in barrels, boxes or paper cartons, whereby the sodium phosphate loses about 25 per cent. of its water of crystallization, becoming so strengthened in the normal salt content, that upon the solution of such an effloresced salt, the excess of the normal dried salt crystallizes out.

Now, whereas the crystallized official sodium phosphate contains 603 grammes of water of crystallization in each kilo, the difference between this and 603 ($1000 - 603 = 397$) or 397 grammes of the exsiccated sodium phosphate U.S.P. should be employed to make 1000 c.c. of the compound solution, the quantities of sodium nitrate, and citric acid and water remaining the same.

The solution prepared as just stated will not deposit crystals of sodium phosphate, and if hot water is employed it can be made with the greatest saving of time, and is of the U. S. P. strength.

President Howard B. French presented to the college specimens of the following coniferous Japanese plants: Golden Shinoro, 20 years old; pot, Shigaragi ware. Avalagi, 25 years old; pot, Shigaragi ware. A Japanese table garden, worked by Mr. Harada. An excellent specimen of Xanthoriza was presented by Prof. Charles H. LaWall. A vote of thanks was tendered the donors of these specimens.

JANUARY.

The fourth of the present series of pharmaceutical meetings was held on Tuesday afternoon, January 19, at 3 o'clock, with Dr. C. A. Weideman, Recording Secretary of the college, in the chair.

Prof. Charles H. LaWall read a paper on "The Differentiation of the Enzymes in Milk by the Use of Hydrogen Peroxide and Its Tests." (See this JOURNAL, p. 57.) The paper was discussed by Dr. Lowe, Mr. England, Professor Kraemer and the author. Prof. LaWall called attention to the fact that in the employment of Hehner's test in detecting formaldehyde in milk, negative results were not indicative that formaldehyde was not present. The test

is only employed in detecting small quantities of formaldehyde, so in case negative results are obtained with the samples of milk another test is made after diluting the milk. Mr. England called attention to the fact that not only preservatives but the use of heat at even temperatures of pasteurization destroyed in a large measure the nutritive value of milk.

Mr. George M. Beringer presented in a general way the results of further studies on "Fluidglycerates" (see AMERICAN JOURNAL OF PHARMACY, 1908, p. 525). He stated that some eight or ten years ago he had conducted some experiments in the preparation of fluidglycerates of chirata, gentian and some other drugs. These he temporarily discontinued until a physician, who was a specialist in rectal diseases, desired him to prepare a non-alcoholic preparation of Krameria. The results of his experiments were shown in the preparation of fluidglycerate of Krameria which proved very satisfactory. Since that time he had experimented with a large number of drugs. He stated that he had found that while some alkaloids, as caffeine, could be extracted with a menstruum of glycerin and water, in a number of instances the addition of an acid was necessary. He called attention that in the preparation of syrups and infusions the fluidglycerates were especially valuable, forming clear and efficient preparations. Mr. Beringer presented to the college a large collection of samples of the fluidglycerates which he had made and in some instances also the marc left in the manufacture of the preparation. An examination of the marc showed that the drugs were completely exhausted. Mr. William McIntyre moved that a vote of thanks be tendered Mr. Beringer for the valuable specimens which he had donated the college and that they be carefully preserved in the museum of the college, which motion was unanimously adopted. The paper was discussed by Messrs. Boring, England, Thum, and the chairman. Mr. Beringer called attention to some experiments made by Professor Asher, of New Orleans, in which he had employed repercolation very satisfactorily in making fluidglycerate of wild cherry.

A paper on "The Physiological Action of Fluidglycerates of Digitalis and Ergot" by John Rippetoe was read in the absence of the author by Mr. E. M. Boring (see this JOURNAL, p. 84).

Mr. John K. Thum, apothecary in the German Hospital, read an abstract of Mr. Caswell A. Mayo's paper on "The Dispensing of Sterile Solutions in Ampullas" which was published in the *American*

Druggist (1909, p. 379). Mr. Thum also showed ampullæ with sterile solutions which he had prepared.

The Secretary called attention to a number of specimens which had been presented to the college. A specimen of spruce and spruce gum from Maine by Mr. M. I. Wilbert; a candy from a cactus of Mexico by A. L. Guerra; cassia chips from Prof. Charles H. La Wall.

HENRY KRAEMER, Secretary.

THE PHILADELPHIA BRANCH OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

A PROMISING INNOVATION.

The many members and friends of the American Pharmaceutical Association who took part in the first, or initial demonstration in the post-graduate course for local pharmacists will long remember the treat that was given them, by Professor Kraemer and his assistants, in connection with the possibilities of the compound microscope, for study, for diversion and for practical application to the many problems that arise in connection with the everyday business of the retail druggist.

This first demonstration, in the course of the Philadelphia Branch of the American Pharmaceutical Association, was given in the Philadelphia College of Pharmacy on the evening of Tuesday, November 17, 1908, and was attended by upwards of 75 members and friends of the local branch.

The demonstration was both didactic and practical. The first portion, somewhat in the nature of a "Conversatione" was held in the Lecture Hall and was profusely illustrated by means of apparatus, specimens and projections on the screen by means of a microscope attachment to the projecting lantern.

This portion of the demonstration included an outline of the methods necessary for the "Preparation of crude drugs for examination," the "Micro-measurement of characteristic elements," the "Study of a few drugs and spices," the "Examination and detection of some common adulterants," the practical demonstration of structural characteristics of a number of drugs, such as belladonna, hyoscyamus, apocynum, ginger, nux vomica and others, the micro-

scopical study of crystals, by means of the polarizing device, the detection of deteriorated drugs and a consideration of the practical application of these several subjects.

Before adjourning to the laboratory, where the practical work was to be undertaken, Mr. William McIntyre, as President of the Philadelphia Branch of the American Pharmaceutical Association, expressed the thanks of the members present, to Prof. Kraemer for the interesting and really enjoyable evening that he had provided, and also expressed the hope that this was but the first of a long series of such meetings in which the members who knew but little of any one subject could come and listen to, and see demonstrations by men who were expert and learned in their particular branches. He expressed the belief that if the pharmacist of to-day would enlarge on his field of knowledge in the sciences relating to his calling he would be not alone a better but also a more successful pharmacist.

Following the adjournment of the more formal meeting the members proceeded to the laboratory where the embryo microscopists examined drug specimens and prepared microscopic slides until a late hour, and many of them, near midnight, appeared to be loath to leave the glimpse of the, to them, new world of the infinitely small that had been revealed, to at least some of them, for the first time on this memorable evening.

The second of the post-graduate demonstrations given under the auspices of the Philadelphia Branch of the American Pharmaceutical Association will be held in the hall of the Medico-Chirurgical College of Pharmacy and will be devoted to a consideration of "Clinical Laboratory Work as a Possibility for Future Pharmacists."

The other lectures are as follows:

January 19, 1909: Pharmacodynamics, Practical Tests for the Efficiency of Drugs. At the H. K. Mulford Co.'s Laboratory, 428 S. 13th St.

February 16, 1909: The Transformation of Elements and Modern Theories of Matter. At the Central High School.

March 16, 1909: Assay Processes, Their Uses and Practical Value. At the Temple College of Pharmacy.

April 20, 1909: Botany as a Hobby and a Useful Science for Pharmacists. At the Philadelphia College of Pharmacy.

M. I. Wilbert.

THE CITY OF WASHINGTON BRANCH OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The first regular meeting of the City of Washington Branch of the American Pharmaceutical Association was held in the hall of the National College of Pharmacy, which, contrary to the predictions of the more sceptical was filled to overflowing, " standing room only " being available even before the meeting was called to order by Dr. H. W. Wiley.

After calling the meeting to order, Dr. Wiley presented an appropriate and timely address in the course of which he outlined the work that the local branch might well essay to do, and also pointed out some of the needs of the hour and the imperative necessity that pharmacists all over this country recognize, that the abuse of habit-forming drugs presents one of the most serious problems of the day, and one that well merits the careful thought and the co-operation of every right-thinking pharmacist in the country.

Dr. W. O. Emery outlined and reported on the efficiency of a method, that has been shown to be both simple and satisfactory, for separating the several constituents of headache mixtures.

Dr. C. E. Parker read a paper on " The Assaying of Drugs," in the course of which he pointed out the need for pharmacists applying themselves to the development of the official assay methods and thus demonstrating both their willingness as well as their ability to live up to the professional demands of their calling.

The concluding communication consisted of a demonstration of " Adulterated Drugs," by Dr. L. F. Kebler, the Chief of the Drug Laboratory. This demonstration only served to emphasize what the other speakers had endeavored to make clear, namely, the constant need for watchfulness on the part of the pharmacist who is anxious to protect his customers.

The members also unanimously adopted a resolution recommending that the Council of the A. Ph. A. arrange for a consecutive meeting with the N.A.R.D. in 1909, at some readily accessible central point, preferably Niagara Falls.

M. I. WILBERT, Secretary.